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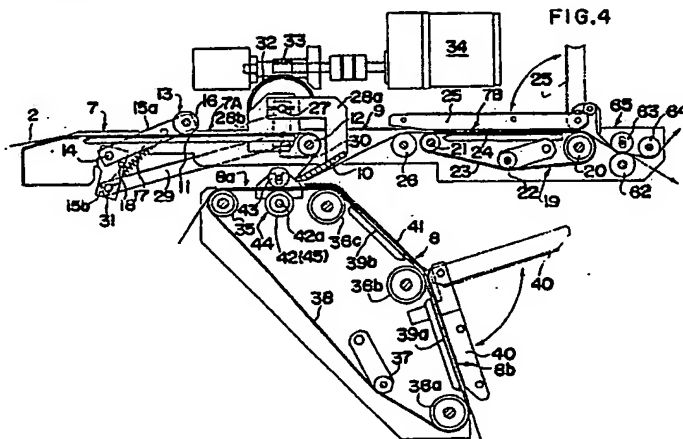
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(54) Labelling system.

(57) A labelling system (1) for automatically sticking a label (3) bearing a message or an advertisement, in sequence, on a continuous band-shaped paper (2) which is material for producing post cards (4), which comprises a paper conveying device for sequentially feeding the continuous paper (2) to a predetermined position for adhering the labels (3), and a label adhering device for sticking the labels (3) on the fed paper (4) at the aforesaid position.



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LABELLING SYSTEM

BACKGROUND AND PURPOSE OF THE INVENTION

The present invention relates to a labelling system which automatically and continuously sticks labels indicating a message, an advertisement, etc. to an object material consisting of a continuous band-shaped sheet intended to form post cards, advertising documents, etc..

In recent years, quick communication with costumers, etc. has become indispensable for business activities in financial, health, credit and mass sale industries as well as in government and municipal offices, and there are now growing needs and expectations for labour saving in communications.

In such communication work, one cannot effectively handle post cards, which are one of the communication means, if one writes messages on them manually as one did in the past. Moreover, direct printing on post cards is unsuitable for the indication of messages which differ from one another.

Hence, the present invention relates to an idea of saving labour in communication work by using labels indicating written messages of different contents or other communication matters such as common advertisements and automatically sticking them to post cards.

In the past, there has existed no alternative other than handwork for most kinds of the communication work mentioned above because no system capable of adhering labels automatically and rapidly to a large quantity of object materials such as post cards was available.

Therefore, the first object of the present invention is to provide an automatic labelling system which sticks labels automatically and rapidly to a large quantity of object materials such as a continuous sheet for post cards.

Also important in such an automatic system is the ease of replacement or setting of labels to be adhered to the object material, as in many cases the labels are different from one another in the content of their messages, as mentioned earlier. If the replacement or setting of labels on the system cannot be performed easily such a system cannot be put to practical use.

Therefore, the second object of the present invention is to enable easy replacement and setting of labels in the automatic system.

Further objects and effects of the present invention will become clear from the explanation of exemplified embodiments given hereafter.

Brief description of the drawings:

Fig. 1 is a perspective view of a preferred embodiment of the labelling system according to the present invention.

Fig. 2 is a plan view indicating a band-shaped release paper with labels and a continuous sheet for post cards.

Fig. 3 is a perspective view of a post card provided with a label.

Fig. 4 is a longitudinal sectional view of a preferred embodiment of the labelling system according to the present invention.

Fig. 5 is a side view of a transmission system according to the present invention.

Fig. 6 is a plan view of the system shown in Fig. 5.

Fig. 7 is a longitudinal sectional view showing the conveying route of band-shaped release paper at the time of setting.

Fig. 8 is a longitudinal sectional view of the arrangement for causing the protrusion of the tip of labels and continuous sheet for post cards.

Fig. 9 is a longitudinal elevation indicating the condition of conveyance of the band-shaped release paper and continuous sheet for post cards as well as the labels to be peeled off by a turning guide.

Fig. 10 is a longitudinal sectional view of the arrangement for the setting condition of continuous sheet for post cards.

Fig. 11 is an elevational view of the arrangement shown in Fig. 10.

Fig. 12 to Figs. 15 indicate other examples of the present invention. Of these, Fig. 12 is a longitudinal sectional view showing the labelling system.

Fig. 13 is a side view showing the transmission system.

Fig. 14 is a plan view of the system shown in Fig. 13, and

Fig. 15 is a longitudinal sectional view indicating the conveying route of band-shaped release paper at the time of setting.

Detailed description of the preferred embodiments

Described below is a preferred embodiment of the present invention with reference to the attached drawings.

Fig. 1 indicates a labelling machine provided with the labelling system 1 of the present invention arranged in such a way that it sticks the labels 3 adhered in a detachable way on one side of the

band-shaped release paper in the specified position of the continuous sheet for post cards 4, which is the object material for labelling, and rolls up the band-shaped release paper 2 divested of labels by means of a winder 5.

As shown in Fig. 2, the band-shaped release paper 2 is provided with feed holes 2a at regular intervals on both side edges in the longitudinal direction and with labels 3 adhered on one face in a detachable way with a certain space 2b between them in the longitudinal direction. The continuous sheet for post cards 4 is provided with feed holes 4a on both side edges in the longitudinal direction at the same intervals as those of the said feed holes 2a and forms post card areas 4c in two rows in the direction of width with the perforation 4b for separation. The labelling machine shown in Fig. 1 is designed to fit the labels 3 peeled off from the band-shaped release paper 2 at the specified position in each post card area 4c as indicated with dashed lines by using two sheets of band-shaped release paper 2 arranged correspond with each row of the post card area 4c in the said continuous sheet for post cards 4 and produce post cards 6 provided with a label 3 adhered at the specified position on one face as shown in Fig. 3 by cutting the continuous sheets for post cards 4 provided with labels at the perforation 4b to separate each post card area 4c.

The said labelling system 1 is provided, as indicated in Fig. 4, with a straight and horizontal conveying route 7 for band-shaped release paper and a conveying route 8 for post cards provided under the conveying route 7. The said conveying route 7 for band-shaped release paper is arranged in two parallel rows for the purpose of transporting the two sheets of band-shaped release paper 2 in parallel as mentioned earlier, and each conveying route 7 comprises an upstream side conveying route portion 7A and a downstream side conveying route portion 7B arranged in series across a vertical opening 9 positioned between them. A turning guide 10 for band-shaped release paper, which moves the said opening 9 vertically, is disposed over the said two (left and right) rows of conveying route 7 for band-shaped release paper. The said upstream conveying route portion 7A consists of a fixed guide plate 11 forming a guide face for conveyance of the band-shaped release paper 2 and a guide roller 12 arranged at the end thereof on the side of the opening 9 and, moreover, is provided with a braking device 13 which pushed the band-shaped release paper 2 together with the said fixed guide plate 11. This braking device 13 consists of a braking roller 16 supported by a shaft in a rotatable way between the top ends of a pair of (left and right) first mobile arms 15a held on axis in a vertically swingable manner by a horizontal sup-

porting shaft 14 under the said fixed guide plate 11, and is provided with a power spring 17 between the second mobile arm 15b supported on its axis in longitudinally swingable manner by the said horizontal supporting shaft 14 and the said first mobile arm 15a in such a way as to push the said first mobile arms 15a against the stopper pin 18 of the second mobile arm 15b.

The said downstream side conveying route portion 7B is provided with a conveying device 19 for the band-shaped release paper. This conveying device 19 consists of a pair of (left and right) chains with feed claws 23 (the feed claws are not shown), which is stretched between a driving toothed wheel 20 and a driven toothed wheel 21 and applied with a suitable tension by a mobile toothed wheel 22 for tensioning, a fixed guide plate 24 and a freely rising and falling presser guide 25. A guide roller 26 is disposed close to the said opening 9 side end of this conveying device 19.

The said turning guide 10 for band-shaped release paper is mounted horizontal in the transversal direction at the tip of the vertically swingable first mobile arm 28a one end of which is fixed to a horizontal driving shaft 27 disposed in the transversal direction, and the second mobile arm 28b fixed to the said driving shaft 27 and the second mobile arm 15b which moves up and down the said braking device 13 are linked with each other through an interlocking link 29. Reference numerals 30 and 31 indicate connecting pins between the interlocking link 29 and the mobile arms 28b, 15b, and one end of the said power spring 17 is attached to the connecting pin 31 for connection with the mobile arm 15b. A worm wheel 32 is fixed to the said driving shaft 27, and the worm gear 33 occluding with this worm wheel is designed to be rotatable in both the forward (normal) and reverse directions as desired by means of a motor 34.

Therefore, if the said motor 34 rotates the driving shaft 27 in the normal direction (clockwise direction in Fig. 4) by means of the worm gear 33 and the worm wheel 32, the turning guide 10 is rotated in the same direction due to the first mobile arm 28a and moves up obliquely to the inside (lower part) of the conveying route 7 for band-shaped release paper via the opening 9 to be in the peeling position. At the same time, the second mobile arm 15b for moving up and down the braking device 13 is rotated in the same direction by means of the second mobile arm 28b and the interlocking link 29 and, in keeping with this action, the first mobile arm 15a also turns in the same direction through the power spring 17, causing the braking roller 16 to touch the upper face of the fixed guide plate 11 of the upstream side conveying route portion 7A. Simultaneously, the second mobile arm 15b turns a little even after the braking

roller 16 touches the upper face of the fixed guide plate 11 so that the first mobile arm 15a is detached from the stopper pin 18 of the second mobile arm 15b and the braking roller 16 is pressed against the upper face of the fixed guide plate 11 with the pressing force of the power spring 17.

The said conveying route 8 for the post card sheet comprises a pair of (left and right) chains with feed claws 38 (the feed claws are not shown) stretched on a driving toothed wheel 35 and a plural number of driven toothed wheels 36a - 36c arranged so as to form a horizontal route portion 8a which is adjacent to the end of the turning guide 10, which has moved to the label peeling position, and the conveying direction of which is opposite to that of the conveying route 7 for band-shaped release paper and a mounting route portion 8b which is connected to the starting end position of that horizontal route portion 8a, and applied with a suitable tension by a mobile toothed wheel for tensioning 37, fixed guide plates 39a, 39b, a freely rising and falling presser guide 40 and a fixed presser guide 41. Moreover, this conveying route 8 for post cards is provided with a labelling device 44, consisting of a driving roller 42 and a presser roller 43, on the downstream side of the direction of conveyance in the horizontal route 8a from the turning guide 10 which has moved to the label peeling position, as mentioned earlier. The said driving roller 42 is driven at the same peripheral speed as the moving speed of the said chain 38 with the occlusion of a toothed wheel 45 fixed to its driving shaft 42a with the said chain 38.

Close to the terminal end of the conveying route 7 for band-shaped release paper, there is a feed device 65 for band-shaped release paper consisting of a driving roller 62, a presser roller 63 and a driven guide roller 64.

As shown in Fig. 5 and Fig. 6, timing pulleys 46, 47 are fixed respectively to the driving shafts 20a, 35a of the driving toothed wheel 20, which drives the chain 23 of the said conveying device 19 for band-shaped release paper, and of the driving toothed wheel 35 which drives the chain 38 constituting the conveying route 8 for post cards, and a timing belt 50 is stretched over the timing pulley 49 fixed to the driving shaft 48a of the motor 48 and the said timing pulleys 46, 47 in such a way that the timing pulleys 46, 47 may rotate in the direction of the arrow indicated in Fig. 5. Electromagnetic clutches 51, 52 are inserted between the driving shafts 20a, 35a and the timing pulleys 46, 47 respectively and electromagnetic brakes 54, 55 are also provided between the driving shafts 20a, 35a and the fixed frame 53 of the machine respectively, as shown in Fig. 6. Moreover, the said driving shaft 20a is interlocked with the driving

shaft 62a of the driving roller 62 and the driving shaft 66a for winder 5 in the band-shaped release paper feed device 65 shown in Fig. 4. The driving shaft 62a for the winder 5 is interlocked with the driving shaft 5a of two (upper and lower) winders 5 through an electromagnetic clutch respectively and can selectively drive the two (upper and lower) winders 5. Reference numeral 60 indicates a driven guide pulley.

A detecting device 67 for detecting the protruding tip of the post card sheet is linked with the driving toothed wheel 35 of the chain with feed claws 38 constituting the conveying route 8 for the post card sheet through its driving shaft 35a as shown in Fig. 5 and Fig. 6. The number of teeth of the said driving toothed wheel 35 is determined in such a way that the wheel conveys the continuous sheet for post card 4 by a length L in the direction of length of the sheet of each post card area 4c indicated in Fig. 2 per rotation, while the said detecting device 67 comprises a disk 68 fixed to the said driving shaft 35a and is provided with a slit 68a at one point of the periphery and a transmission photoelectric switch 69 which detects the said slit 68a. Therefore, every time the chain 38 for conveyance of post card sheet turns through the said length L, a detection signal is given by the photoelectric switch 69 which is activated by the slit 68a. Moreover, the control circuit of the said motor 48 is arranged in such a way as to stop the motor 48 with the output of the logical sum of the instruction for the stopping of labelling and the detection signal from the said detecting device 67 (photoelectric switch 69).

In the following, the setting method of the band-shaped release paper 2 on the conveying route 7 for band-shaped ground paper is explained. Firstly, the driving shaft 27 is rotated through 90 degrees in the reverse direction with the motor 34 indicated in Fig. 4 to switch the turning guide 10 to the position of release by moving it out (upward) of the conveying route 7 with the first mobile arm 28a as shown in Fig. 7. At the same time, the second mobile arm 15b is rotated for lifting the braking device in the same direction by means of the second mobile arm 28b and the interlocking link 29, and the first mobile arm 15a is rotated upward through the stopper pin 18 to keep the braking roller 16 away upward from the fixed guide plate 11. Under this condition, the tip of the band-shaped release paper 2 with labels loaded at the specified position as shown in Fig. 1 is taken hold of and, with the side provided with labels 3 located on the inner surface (down), it is pulled by hand up to the downstream side conveying route portion 7B, and passed between the fixed guide plate 11 and the braking roller 16 on the upstream side conveying route portion 7A of the said conveying route 7 for

band-shaped release paper and between the opening 9 and the turning guide 10 as shown in Fig. 7. After that, the feed holes 2a are occluded on both side edges of the band-shaped release paper 2 with the feed claws 23a of the chain with feed claws 23 on the conveying device 19 as shown in Fig. 9 and the presser guide 25 indicated in Fig. 4 is lowered to set the release paper. The band-shaped release paper 2 is pulled by hand and guided to either of the upper and lower rolling devices 5, passing it between the driving roller 62 and the presser roller 63 of the feed device 65 for band-shaped release paper and under the free guide roller 64 to set the tip of the band-shaped release paper 2 on the said rolling device 5.

Next, after the driving shaft 20a of the conveying device 19 is locked by means of the electromagnetic brake 54, the driving shaft 27 is rotated through 90 degrees in the direction of normal rotation by operating the motor 34 of Fig. 4, to lower the turning guide 10 which had been located in the position of release indicated in Fig. 7, and the braking roller 16 is allowed to drop onto the fixed guide plate 11 at the same time. Consequently, the band-shaped release paper 2 positioned on the opening 9 is pushed down obliquely by the turning guide 10 as shown in Fig. 4 and makes a detour in the form of a 'V' at the point where it passes from the upstream side conveying route portion 7A to the downstream side conveying route portion 7B as illustrated. Simultaneously the band-shaped release paper 2 is pulled although it never arises that the band-shaped release paper 2 set on the downstream side conveying portion 7B moves backwards toward the turning guide 10 due to this pulling, as the chain with feed claws 23 of the conveying device 19 is locked by the said electromagnetic brake 54. Moreover, on the upstream side conveying route portion 7A, the band-shaped release paper 2 is sufficiently braked by being pressed against the fixed guide plate 11 by the braking roller 16 and, therefore, the band-shaped release paper 2 is always maintained in a strained condition without loosening downstream of this braking roller 16, namely around the turning guide 10.

It should be noted that the area ranging from the tip of the band-shaped release paper 2 set on the rolling device 5 to beyond the end of the turning guide 10 on the upstream side becomes a dummy area for setting and, for that reason, the labels 3 which had been adhered in this area are peeled off prior to the setting.

When the setting of the band-shaped release paper 2 is over, the tips of the labels 3 are made to protrude. Namely, the chain with feed claws 23 of the conveying device 19 is driven by releasing the electromagnetic brake 54 and, at the same time,

the electromagnetic clutch 51 is closed only to move the band-shaped release paper 2 so as to pull it with the chain with feed claws 23 of the said conveying device 19 and, when the tip of the foremost label 3 stuck on the said band-shaped release paper 2 has reached the specified position near the tip of the turning guide 10 as shown in Fig. 8, the electromagnetic clutch 51 is released to stop the driving of the conveying device 19. As mentioned earlier, the fact that the tip of the foremost label 3 has reached the specified position near the tip of the turning guide 10 can be detected with the activation, at the time of passage of the rear end of the foremost label 3, of the photoelectric switch for label detection 70 disposed in a position corresponding to the rear end of the foremost label which has reached the specified position as shown in Fig. 8. The photoelectric switch 70 is activated by the thin band-shaped release paper 2 because its beam passes through it, whereas it is deactivated by the point of lapping of label 3 and band-shaped release paper 2 because the beam cannot pass through that point, and, based on this detecting action, the electromagnetic clutch 51 may be released. At this time, the chain with feed claws 23 of the conveying device 19 can be locked as required by closing the electromagnetic brake 54.

Next, the setting and causing of the protrusion of the tip of the continuous sheet for post cards 4 is explained. The tip of the continuous sheet for post cards 4 loaded in the specified position of the labelling machine, as shown in Fig. 1, is taken out, and, by fitting the tip of the continuous sheet for post cards 4 at a specified position on the conveying route 8 for post card sheet, for example at the position indicated by the sheet end position indicating mark 71 given on the fixed guide plate 39a in the mounting route section 8b, the feed holes 4a of the said continuous sheet for post cards 4 are occluded with the feed claws 38a of the chain 38 and the presser guide 40 lowered to set the sheet. Following this, the electromagnetic clutch 52 indicated in Fig. 6 is closed and, if the electromagnetic brake 55 is working, this is released at the same time to drive the chain for conveyance of post card sheet 38 by transmitting the turning force of the motor 48 to the driving toothed wheel 35. Before it is driven, the chain for conveyance of post card sheet 38 is stopped in the position when a detecting signal is outputted from the detecting device 67 (position where the photoelectric switch 69 detects the slit 68a of the disk 68) according to the functioning of the said detecting device 67 as explained earlier.

When the tip of the continuous sheet for post cards 4 has reached the specified position near the tip of the turning guide 10 as shown in Fig. 8, the

conveyance of post card sheet 4 by chain 38 is stopped by releasing the said electromagnetic clutch 52. Namely, since the tip of the continuous sheet for post cards 4 has reached the specified position near the tip of the turning guide 10 as shown in Fig. 8, this can be detected by the transmission photoelectric switch 72 which detects the tip of the said post card sheet 4, and the tip of the continuous sheet for post cards 4 can be stopped automatically at the specified position near the tip of the turning guide 10 as shown in Fig. 8 by releasing the electromagnetic clutch 52 when the said electromagnetic switch 72 has switched from ON state to OFF state by detecting the tip of the post card sheet 4.

It should be noted that the distance from the said sheet end position indicating mark 71 to the detecting position of the said photoelectric switch 72 is fixed to be equal to a dimension an integral number of times the unit length L in the direction of length of the sheet of each post card area 4c in the continuous sheet for post cards 4, so that a detecting signal may be obtained also from the said detecting device 67 (photoelectric switch 69) when the said photoelectric switch 72 detects the tip of the continuous sheet for post cards 4.

If the setting and the causing of protrusion of the tip of the band-shaped release paper 2 and the continuous sheet for post cards 4 are completed, the electromagnetic clutches 51, 52 are closed to turn the chain with feed claws 23 provided in the conveying device 19 of the conveying route 7 for band-shaped release paper and the chain with feed claws 38 of the conveying route 8 for post cards at the same speed. As a result, the band-shaped paper moves on the conveying route 7, being pulled by the chain with feed claws 23 of the said conveying device 19, while the continuous sheet for post cards 4 moves at the same speed on the horizontal route section 8a of the conveying route for post cards 8 in the direction opposite to the direction of movement of the said band-shaped release paper 2.

Thus, when the band-shaped release paper 2 turns up obliquely in the form of V at the tip of the turning guide 10, the label 3, the rigidity of which is greater than that of the band-shaped release paper 2, moves down obliquely in the direction of extension under the turning guide 10 away from the band-shaped release paper 2 and, in the state of lapping with the continuous sheet for post card 4 moving in the opposite direction on the horizontal route section 8a of the conveying route for post cards 8 at the specified position inside each post card area 4c, passes through between the driving roller 42 and the presser roller 43 in the subsequent labelling device 44. In this way, the label 3 peeled from the band-shaped release paper 2 is

automatically adhered on the specified position inside each post card area 4c in the continuous sheet for post cards 4 as indicated by the dashed lines in Fig. 2.

Since the said conveying device 19 is driven as explained earlier, the rotation of its driving shaft 20a is transmitted to the driving roller 62 of the band-shaped release paper feed device 65 and to the transmission shaft for winder 66a through the timing pulleys 56 to 58 and the timing belt 59 and, after the labels 3 are peeled off, the band-shaped release paper 2 carried out by the conveying device 19 is moved out forcibly between the driving roller 62 and the presser roller 63 of the said feed device 65 and passes through under the free guide roller 64, to be automatically rolled by the winder 5 which is set in advance as indicated in Fig. 1.

When interrupting the labelling work, the motor 48 is stopped with the output of the logical sum of the stop command for that interruption and the detecting signal of the said detecting device 67 (photoelectric switch 69) for the protruding of the tip of the post card sheet and, if necessary, the driving shafts 20a, 35a are also braked with the electromagnetic brakes 54, 55 at the same time. Therefore, the band-shaped release paper 2 and the continuous sheet for post cards 4 always stop in the position where the tip of the label 3 to be stuck next protrudes at the specified position near the tip of the turning guide 10 (condition in which the photoelectric switch 70 for label detection detects the rear end of the label 3 concerned) and also in the state where the front end of the post card area 4c on which to adhere the label 3 next (position of perforation 4b for separation) is found in the detecting position of the photoelectric switch 72 for detection of the end of the post card sheet, so that it never arises that they stop while the label 3 is being adhered to the continuous sheet 4 for post cards.

Consequently, at this state of interruption of labelling work, it is possible to release the electromagnetic clutch 51, release the electromagnetic brake 54, if it is working, and make a positional adjustment of the label 3 as required by moving the band-shaped release paper 2 forwards and backwards together with the chain with feed claws 23 of the conveying device 19 or release the electromagnetic clutch 52, release the electromagnetic brake 55, if it is working, and make a positional adjustment of the post card area 4c by moving the continuous sheet for post cards 4 forwards and backwards together with the chain with feed claws 38a, which is the means of conveyance. Moreover, even when the continuous sheet for post cards 4 is moved forwards or backwards together with the chain with feed claws 38a, the front end position of the post card area 4c located on the path of the

continuous sheet for post cards 4, which is undetectable with the photoelectric switch 72, can be detected with the detecting signal of the said detecting device 67 for the protruding of the tip of the post card sheet (photoelectric switch 69), and the protruding of the tip of the post card area 4c found on the path of the continuous sheet for post card 4 can be performed automatically.

In the example the system is set up by interlocking the turning guide 10 and the braking device 13 with each other so that the braking device 13 may move up and down automatically following the ascent and descent of the turning guide 10. However, it may also be arranged in such a way that the braking device may be raised and lowered manually. Moreover, the braking device 13 may comprise a braking means of any construction such as a rubber plate, etc., as an alternative to the braking roller 16 which is used in the example.

Fig. 12 to Figs. 15 show another possible embodiment of the present invention. Parts identical with those of the afore-described embodiment are given the same reference numbers and are not explained. In this example, the upstream side conveying route portion 107A and downstream side conveying route portion 107B of the conveying route 107 for band-shaped release sheet comprise an upstream side conveying device 80 and a downstream side conveying device 81 respectively as shown in Fig. 12.

The upstream side conveying device 80 consists of a pair of (left and right) chains with feed claws 85 (feed claws are not shown), which are stretched between a driving toothed wheel 82 and a driven toothed wheel 83 and a suitable tension is applied by means of movable toothed wheel for tensioning 84, a fixed guide plate 11 and a freely rising and falling presser guide 86.

The said downstream side conveying device 81 consists of a pair of (left and right) chains with feed claws 23 (feed claws are not shown), which are stretched on a driving toothed wheel 20, an intermediate driven toothed wheel 87 and a driven toothed wheel 89 supported by shaft at the free end of a mobile arm 88 swingable vertically about the center of the bearing shaft 87a of this intermediate driven toothed wheel 87 and applied with a suitable tension by a mobile toothed wheel for tensioning 22, a fixed guide plate 24 and a freely rising and falling presser guide 25, and, with an up-down swinging of the said mobile arm 88, can be switched between a horizontal posture constituting part of the said conveying route 107 for band-shaped release paper and a inclined posture slanting down obliquely.

The turning guide 10 for band-shaped release paper is mounted horizontally in the transversal direction at the end of the vertically swingable first

mobile arm 28a, one end of which is fixed to the horizontal driving shaft 27 disposed in the transversal direction, and the second mobile arm 91 is fixed to the said driving shaft 27 and the mobile arm 88 in the said downstream side conveying device 81 are linked with each other through an interlocking link 92. A worm wheel 32 is fixed to the said driving shaft 27, and a worm gear 33 occluding with this worm wheel is designed to be rotatable in both the forward (normal) and reverse directions, as required, by means of a motor 34.

Therefore, if the said motor 34 rotates the driving shaft 27 in the normal direction (clockwise direction in Fig. 12) by means of the worm gear 33 and the worm wheel 32, the mobile arm 88 in the said downstream side conveying device 81 is rotated in a downward direction by means of the second mobile arm 91 and the interlocking link 92, and the starting end 90 of conveying route of the said downstream side conveying device 81 switches to the inclined posture indicated in Fig. 12. At the same time, the turning guide 10 passes obliquely in the upstream direction to the inside (lower part) of the conveying route 107 for band-shaped release paper through the opening 9 which has been widened with the switching to inclined posture of this starting end 90 of conveying route, to be switched to the label peeling position.

As shown in Fig. 13 and Fig. 14, timing pulleys 60, 46, 47 are fixed respectively to the driving shafts 82a, 20a, 35a of the driving toothed wheels 82, 20 which drive the chains 85, 23 of the two conveying devices 80, 81 constituting the said conveying route 107 for band-shaped release paper and of the driving toothed wheel 35 which drives the chain 38 constituting the conveying route for post cards 8, and a timing belt 50 is stretched over the timing pulley 49 fixed to the driving shaft 48a of the motor 48 and the said timing pulleys 60, 46, 47 in such a way that the timing pulleys 60, 46, 47 may rotate in the direction of the arrow indicated in Fig. 13.

Electromagnetic clutches 93, 51, 52 are inserted between the driving shafts 82a, 20a, 35a and the timing pulleys 60, 46, 47 respectively and electromagnetic brakes 56, 57 are also provided between the driving shafts 82a, 20a, 35a and the fixed frame 53 of the machine respectively, as shown in Fig. 14. Of the said electromagnetic clutches 93, 51, 52, the electromagnetic clutches 93, 51 are so-called one-position clutches which, if put under voltage, are connected with each other so as to be in the conductive state only when one fixed point of the transmitter side and one fixed point on the receiver side agree with other.

Next, the setting method of the band-shaped release paper 2 on the conveying route 107 for band-shaped release paper is explained. Firstly,

the driving shaft 27 is rotated through 90 degrees in the reverse direction with the motor 34 indicated in Fig. 12 to switch the turning guide 10 to the position of release by moving it to the outside (upward) of the conveying route 107 with the first mobile arm 28a as shown in Fig. 15. Simultaneously, the mobile arm 88 in the downstream side conveying device 81 is made to go up to move the starting end 90 of conveying route into a horizontal position. In this state, the tip of the band-shaped release paper 2 with labels is removed at the specified position as shown in Fig. 1 and, with the side provided with labels 3 inside (down), the feed holes 2a is occluded on the both side edges with the feed claws 85a of the chain with a pair of (left and right) feed claws 85 in the upstream side conveying device 80 of the said conveying route 107 for band-shaped release paper, and the presser guide 86 is lowered to set the release paper.

Following this, the motor 48 indicated in Fig. 13 and Fig. 14 is activated and the electromagnetic clutches 93, 51 are closed to rotate the driving toothed wheels 82, 20 in the conveying devices 80, 81 of the conveying route 107 for band-shaped release paper and the respective chains with feed claws 85, 23 are made to turn in the same direction. Since the said electromagnetic clutches 93, 51 are one-position clutches, as mentioned above, if these clutches 93, 51 are adjusted in such a way that they are both switched to the transmitting state when the distance L between the feed claw 85a of the upstream side conveying device 80 and the feed claw 23a of the downstream side conveying device 81 becomes equal to a dimension an integral number of times as long as the pitch p of the feed claws 85a, 23a in the two conveying devices 80, 81 the feed holes 2a of the band-shaped release paper 2 conveyed by the turning chain with feed claws 85 of the upstream side conveying device 80 automatically occlude with the feed claws 23a of the chain 23 in the downstream side conveying device 81 when this band-shaped release paper 2 is moved onto the downstream side conveying device 81 through the opening 9, thus taking over the feed action of this downstream side conveying device 81.

If the tip of the band-shaped release paper 2 has been conveyed to the terminal position of the downstream side conveying device 81 as described above, the electromagnetic clutches 93, 51 are released to stop the driving of both the conveying devices 80, 81 and the chains with feed claws, 23 are freed. In this state, the band-shaped release paper 2 is pulled by hand, guided to either of the upper and lower rolling devices 5, being passed between the driving roller 62 of the band-shaped release paper feed device 65 and the presser roller 63 and under the free guide roller 64 and then set

on the end of the band-shaped ground paper 2 on the said rolling device 5. Simultaneously, the presser guide 25 of the downstream side conveying device 81 is lowered to the set position.

Next, after the driving shaft 20a of the downstream side conveying device 81 has been locked by means of the electromagnetic brake 54, the driving shaft 27 is turned through 90 degrees in the direction of normal rotation by operating the motor 34 of Fig. 12 to lower the turning guide 10, which had been in the position of release indicated in Fig. 15, and the starting end 90 of conveying route of the downstream side conveying device 81 is moved down from the horizontal position. As a result, the starting end 90 of conveying route of the downstream side conveying device 81 is switched to an included position, and the turning guide 10 moves down obliquely to the upstream direction through the widened openings 9 to be switched to the label peeling position. Therefore, the band-shaped release paper 2 positioned on the opening 9 is pushed down obliquely by the turning guide 10 and makes a detour in the form of V at the point where it passes from the upstream side conveying device 80 to the downstream side conveying device 81 as illustrated. At this time, the band-shaped release paper 2 is pulled but the situation never arises whereby the band-shaped release paper 2 set on the downstream side conveying device 81 moves backwards towards the turning guide 10 due to this pulling, as the chain with feed claws 85 of the upstream side conveying device 80 is free and the chain with feed claws 23 of the downstream side conveying device 81 is locked by the said electromagnetic brake 54.

The upstream side conveying device 80 is driven only at the time of setting of the band-shaped release paper 2 and is just rotating in the free state following the movement of the band-shaped release paper 2.

According to the embodiments of the present invention which have been explained in detail, the present invention has the following effects:

(1) The label conveying device can be simplified in that it may be provided only in the downstream side conveying route.

(2) When providing a label conveying device in both the upstream side conveying route and the downstream side conveying route, the setting of the band-shaped ground paper with labels is easy as the band-shaped release paper needs only to be connected to the upstream side conveying route.

(3) By providing, in the upstream side conveying route, a braking device which presses the band-shaped release paper under conveyance to brake its movement, it is possible to maintain the band-shaped release paper, which is conveyed by

the downstream side conveying device, always in a strained condition and perform the peeling and the adhering of the labels correctly and smoothly.

(4) The setting of the band-shaped release paper is simple, with no obstacles present on the conveying route of band-shaped release paper, because the braking device is so designed as to be opened upward from the braking position in a synchronized manner with the movement to the position of release of the turning guide for band-shaped release paper.

(5) The braking device can brake the band-shaped release paper securely because it is designed not only to return to the braking position in a synchronized manner with the return to the adhering position of the turning guide for band-shaped release paper but also to be pushed to the band-shaped release paper side with a power spring which is not under the control of the movement of the said turning guide.

(6) Since the starting end of the conveying route of the downstream side conveying device is provided in such a way as to incline obliquely from the straight line on the upstream side conveying route in synchronized manner with the movement of the turning guide of band-shaped release paper, this not only facilitates the setting of the band-shaped release paper by bringing the downstream side conveying route close to the upstream side conveying route when the turning guide for band-shaped release paper is in the position of release, but also makes it possible for the turning guide for band-shaped release paper to move to the adhering position smoothly by widening the opening between the upstream side conveying route and the downstream side conveying route in parallel with the downward oblique movement of the starting end of conveying route.

(7) The labels can be stuck correctly in the fitting position of the object material for adhering, because the system is so designed as to synchronize the actions of the said two conveying devices by means of the detection signals of a label end position detecting device provided in the label conveying device as well as an object material end position detecting device and a labelling position detecting device provided in the object material conveying device.

(8) The setting of the object material is easy because the object material in the object material conveying device needs only be set in such a way as to fit the end of the object material to the object material end position indicating mark provided in that conveying device.

(9) It is very rare for defective products to arise because, even if the labelling work is interrupted during operation, the label and the labelling area of the object material always stop in the state

where they are positioned at the end of the turning guide and never stop during the labelling state.

Claims

1. A labelling system (1) consisting of a label conveying device which carries, almost linearly in the direction of length, a band-shaped release paper (2) provided with labels (3) adhered in a detachable way at regular intervals, an object material conveying device which is located under the said label conveying device and which carries, in the direction opposite to the said direction of conveyance of labels (3), a continuous band-shaped object material (4) for adhering on which to adhere the said labels (3) carried by the said label conveying device, and a label adhering device (44) for automatically fastening, in the adhering position, the labels (3) which are conveyed by the said label conveying device to the object material (4) for adhering which is carried by the said object material conveying device.

2. The labelling system as defined in claim 1 wherein the said label conveying device consists of an upstream side conveying route (7A;107A), a downstream side conveying route (7B;107B) and a turning guide (10) for the band-shaped release paper (2) provided in such a way that it can move between the position of release above the conveying route (7;107) and the adhering position close to the object material conveying device through an opening provided between the two conveying routes (7;107).

3. The labelling system as defined in claim 2 wherein a conveying device (19;81) for band-shaped release paper which carries the band-shaped release paper (2) is provided in the downstream side conveying route (7B;107B).

4. The labelling system as defined in claim 2 wherein the upstream side conveying route (7A;107A) is provided with a braking device (13) which brakes the band-shaped release paper (2) in strained condition during the conveyance of the band-shaped release paper (2).

5. The labelling system as defined in claim 4 wherein the said braking device (13) is designed in such a way that it is opened upwardly from the band-shaped release paper (2) when the said turning guide (10) for band-shaped release paper is in the position of release and brakes the band-shaped release paper (2) when the said turning guide (10) for band-shaped release paper is in the adhering position.

6. The labelling system as defined in claim 4 wherein the said braking device (13) consists of a braking roller (16) which is supported by a support-

ing shaft in a rotatable way at the tip of a first mobile arm (15a) held in a vertically swingable way by a supporting shaft (14) and which is pressed against the band-shaped release paper (2) by the pushing force of a pushing device (17).

7. The labelling system as defined in claim 4 wherein the said braking device (13) consists of a braking roller (16) supported in a rotatable way at the tip of a first mobile arm (15a) held in a vertically swingable way by a supporting shaft (14), a second mobile arm (15b) is pivoted adjustable to the said first mobile arm (15a), the said second mobile arm (15b) and the said turning guide (10) for band-shaped release paper are linked with each other by means of an interlocking link (29), a power spring (17) is provided between the said two mobile arms (15a;15b), and a stopper (18) is provided on the second mobile arm (15b) to allow for the first mobile arm (15a) to move jointly with the second mobile arm (15b) at the time of opening of the braking roller (16).

8. The labelling system as defined in claim 2 wherein the conveying device for band-shaped release paper which carries the band-shaped release paper is provided in both the upstream side (107A) and downstream side (107B) conveying routes, the driving shaft of both the upstream side (107A) and downstream side (107B) conveying routes is interlocked respectively with a common driving source through one-position clutches (51,93); and the pitches of the feed claws (23a,85a) which engage with the band-shaped release paper (2) are determined in such a way as to be equal to a dimension an integral number of times each other on the said two conveying devices (80;81).

9. The labelling system as defined in claim 8 wherein the starting end (90) of the conveying route (107B) of the said downstream side conveying device (81) is arranged to be inclinable obliquely downwards.

10. The labelling system as defined in claim 8 wherein the starting end (90) of conveying route (107B) of the said downstream side conveying device (81) is provided in such a way that it synchronizes with the movement of the turning guide (10) for band-shaped release paper so that it may be located on a straight line of the upstream side conveying route (107A) when the said turning guide (10) for band-shaped release paper is in the position of release and located in the position inclined downwards when the said turning guide (10) is in the adhering position.

11. The labelling system as defined in claim 8 wherein the starting end (90) of conveying route (107B) of the said downstream side conveying device (81) consists of a mobile arm (88) held in a vertically swingable way by a supporting shaft

(87a) and a connecting link (92) which links the said mobile arm (88) and the turning guide (10) for band-shaped release paper.

12. The labelling system as defined in claim 2 wherein the said labelling device (44) consists of a driving roller (42) and a presser roller (43) facing said driving roller (42).

13. The labelling system as defined in claim 12 wherein the said driving roller (42) and presser roller (43) are provided at the positions where the labels (3), which have been peeled off from the band-shaped release paper (2) after making a U-turn to the inside of the said upstream side conveying route (7A;107A), overlap the object material (4) for adhering.

14. The labelling system as defined in claim 1 wherein the label conveying device is provided with a label end position detecting device (70) which detects the arrival of one end of the label (3) at the edge of the turning guide (10) for band-shaped release paper (2) located in the adhering position.

15. The labelling system as defined in claim 1 wherein the conveying device of object material for adhering is provided with a labelling position detecting device (67) which detects the conveying position every time the conveyance passes through a length corresponding to the labelling area (4c) of the band-shaped object material (4) conveyed by the said conveying device.

16. The labelling system as defined in claim 15 wherein the said labelling position detecting device (67) is arranged in such a way as to stop the driving source of the driving devices of labels (3) and object material (4) with the logical sum which consists of the detecting signal corresponding to the end of the label (3), and the instruction signal for stopping the labelling.

17. The labelling system as defined in claim 1 wherein the said object material conveying device is provided with a detecting device (72) for the end position of the band-shaped object material (4) which detects the arrival of the end of the band-shaped object material (4) at the edge of the turning guide (10) for band-shaped release paper located in the adhering position.

18. The labelling system as defined in claim 1 wherein the object material conveying device is provided with an indicating mark (71) for the end position of the object material (4).

19. The labelling system as defined in claim 18 wherein the distance from the said indicating mark (71) for the end position of the object material (4) to the position detected by the labelling position detecting device (67) is determined to be equal to a dimension an integral number of times as long as a labelling area in the band-shaped object material (4).

FIG.1

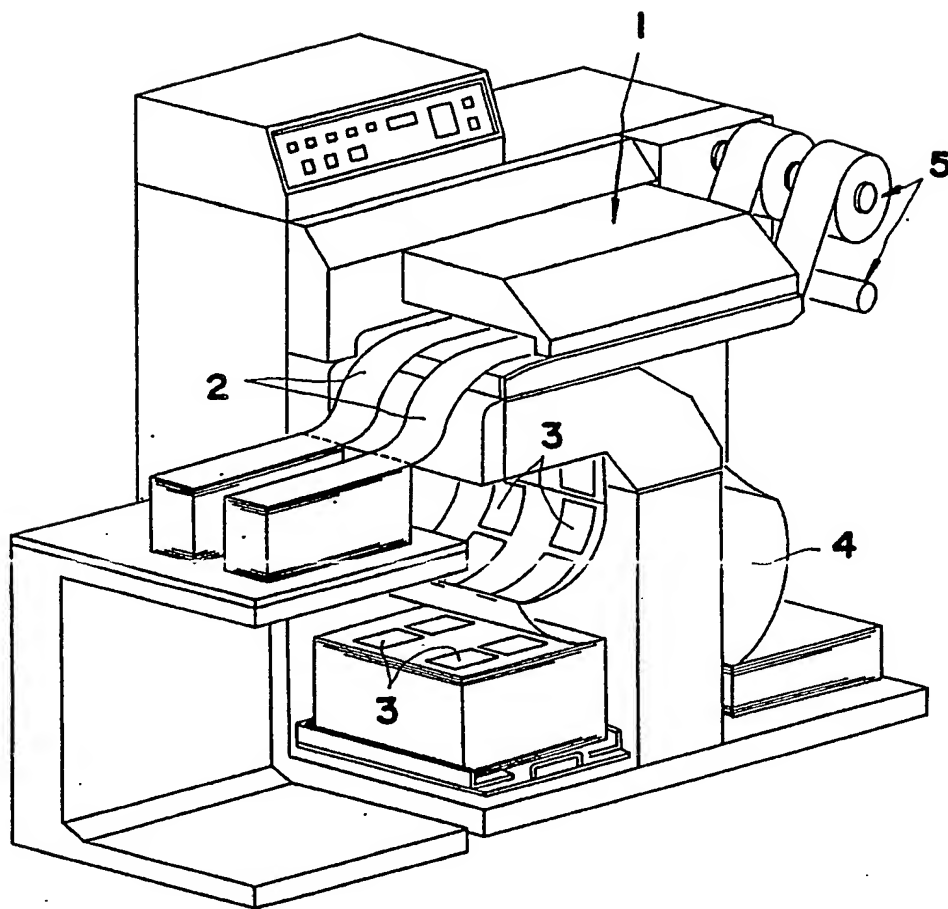


FIG.2

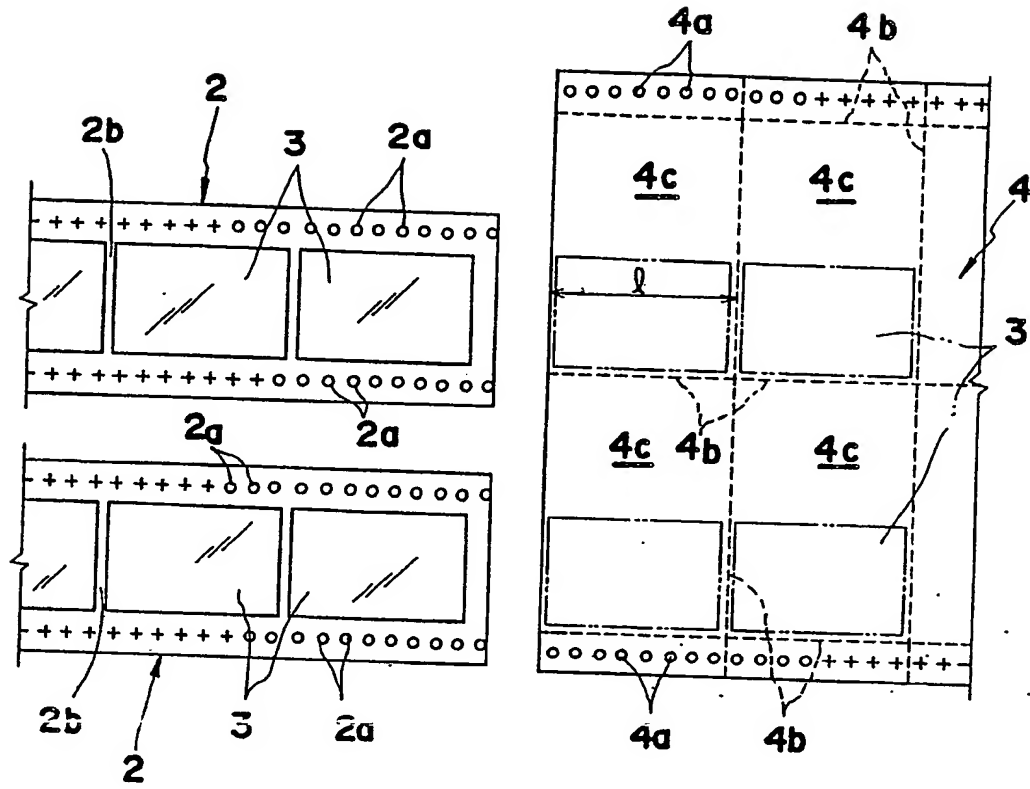
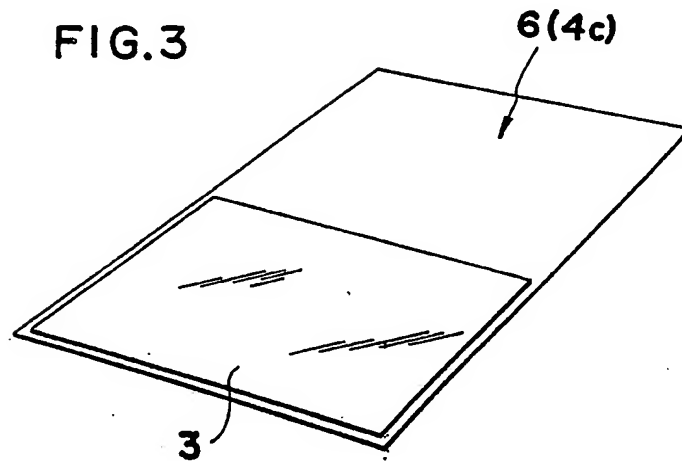


FIG.3



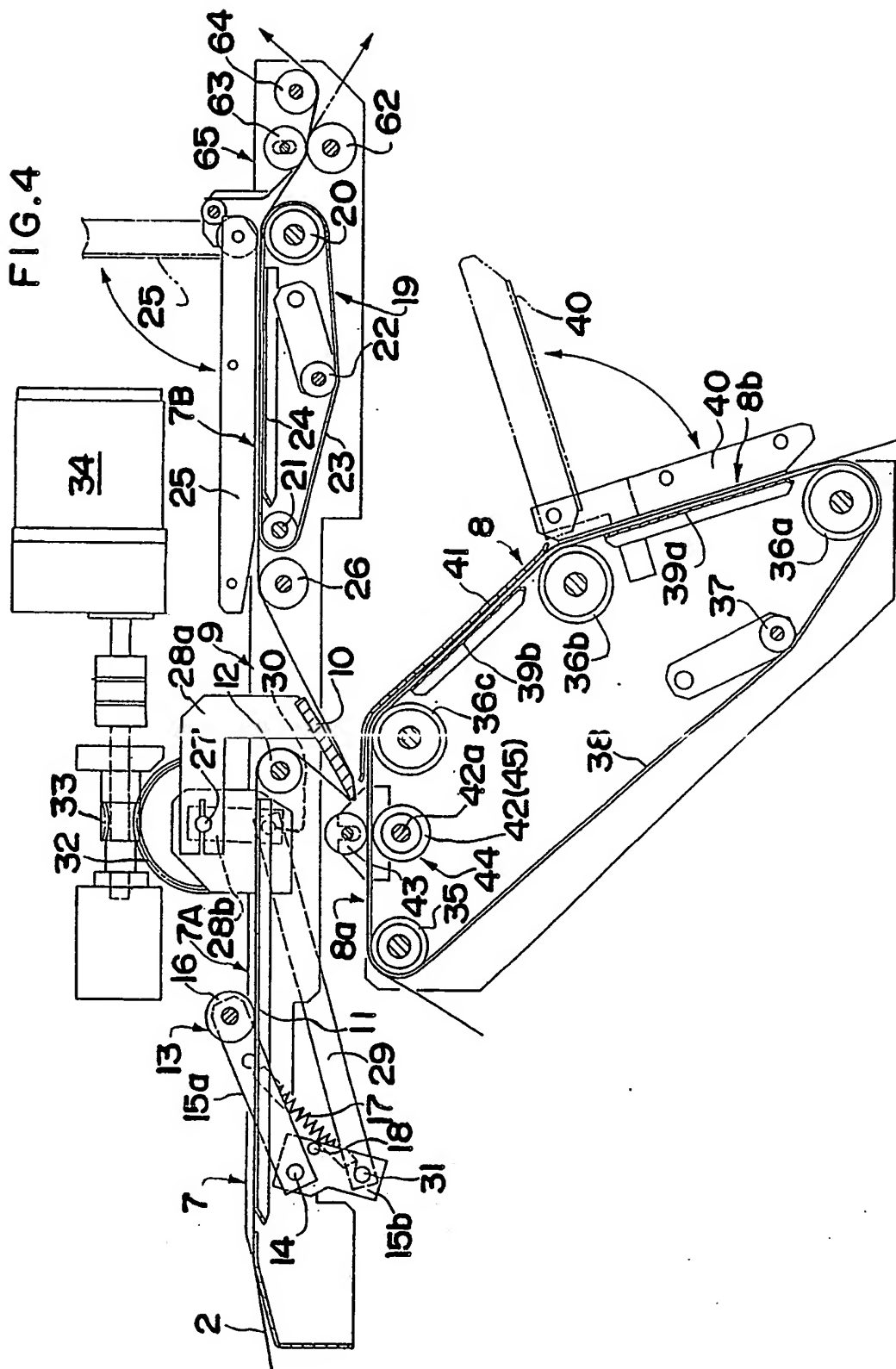


FIG.5

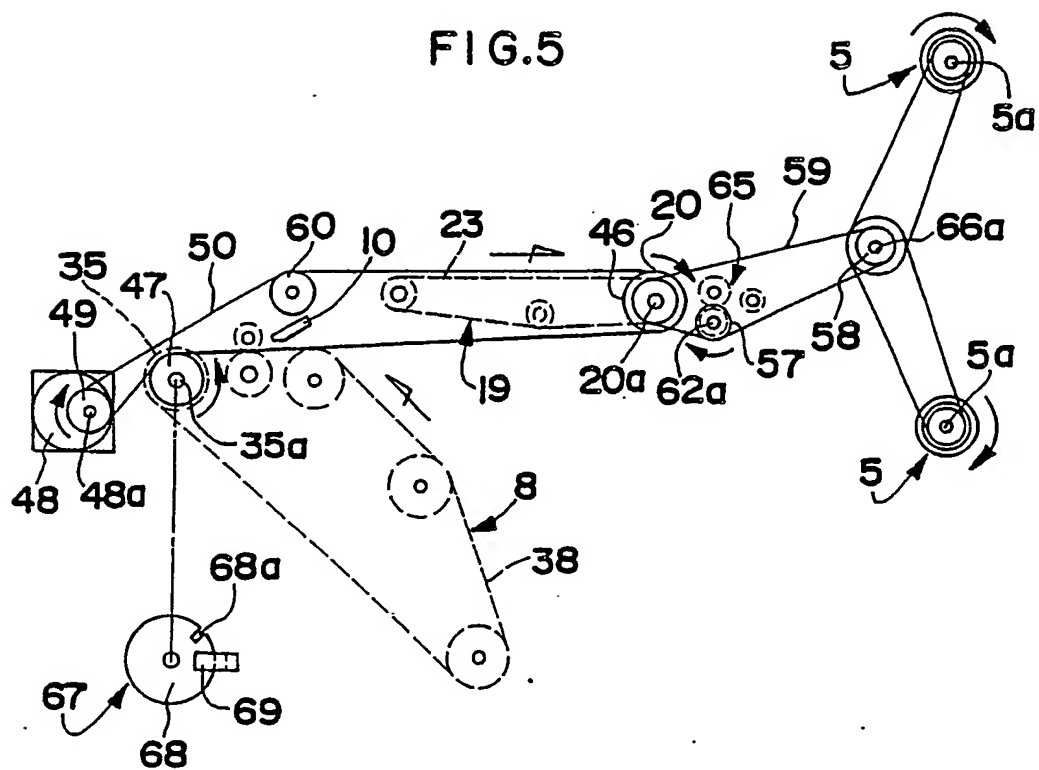


FIG.6

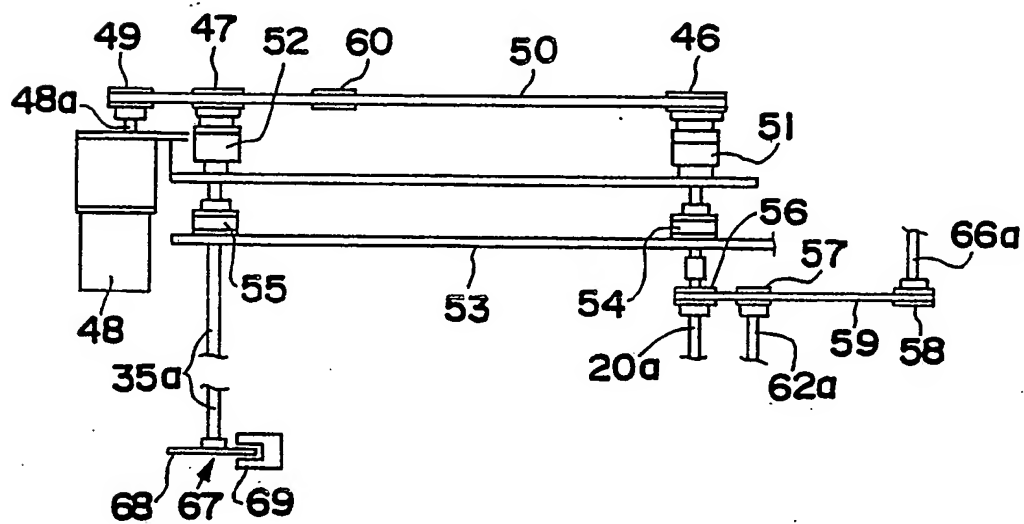


FIG. 7

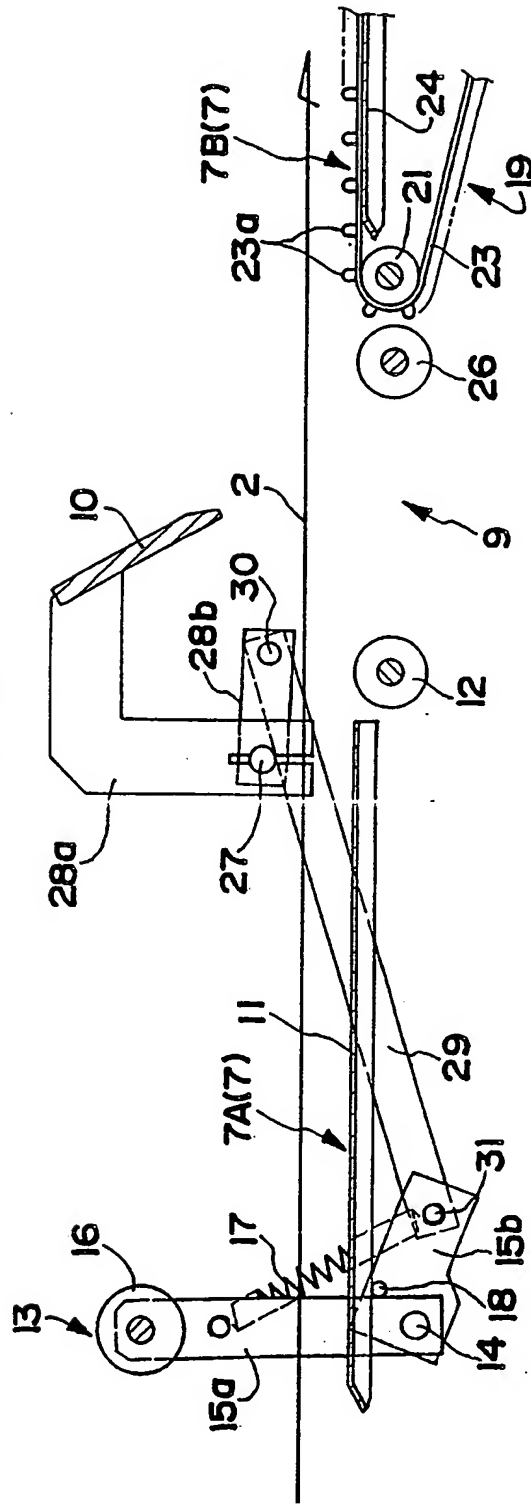


FIG.8

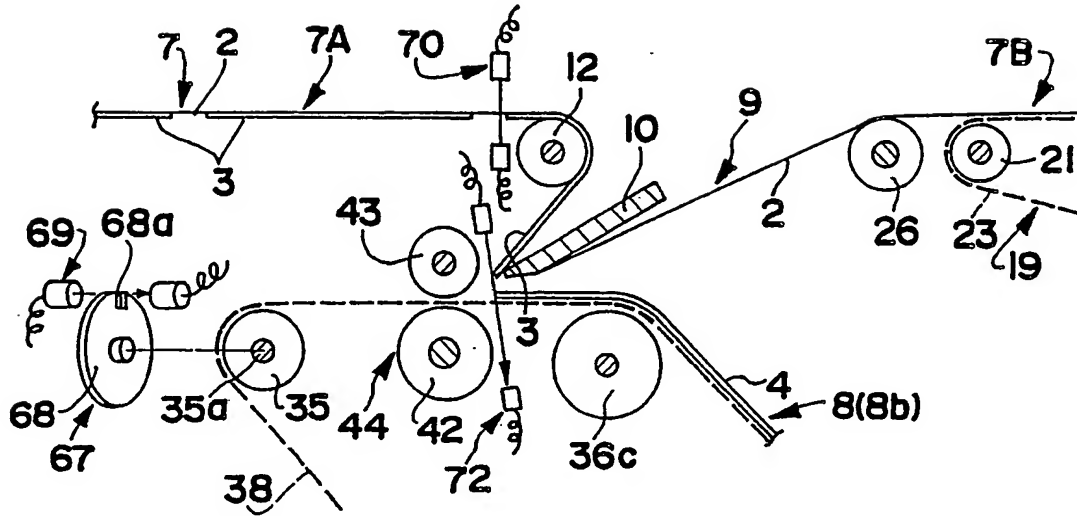


FIG.9

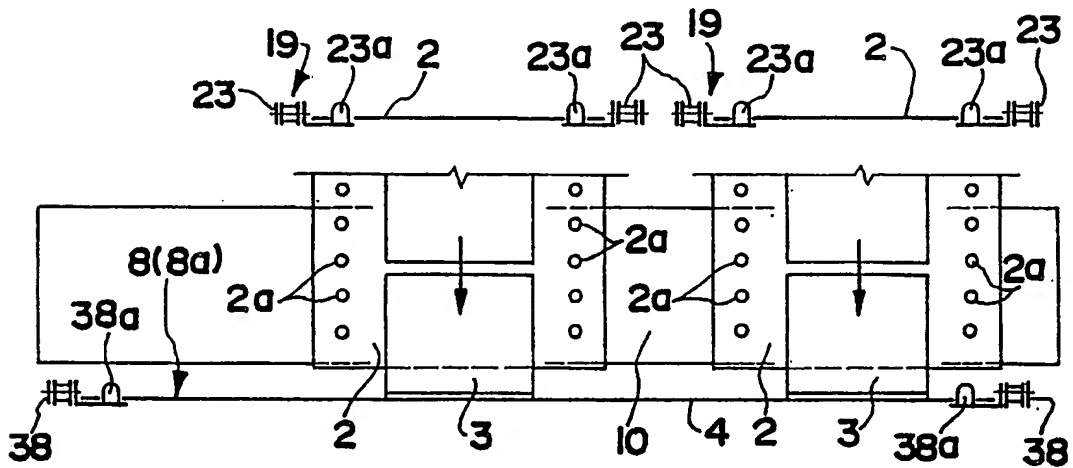


FIG.10

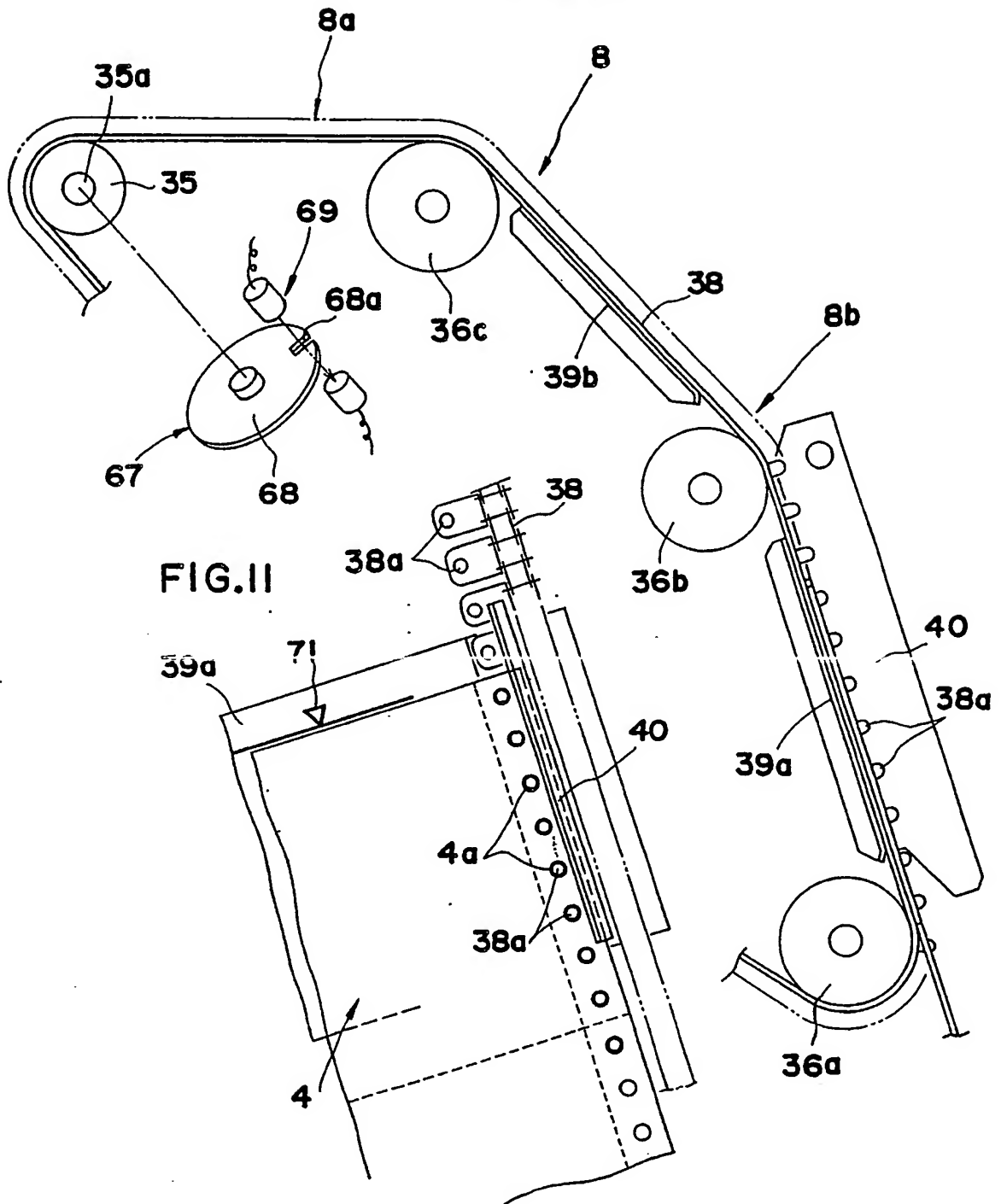


FIG.11

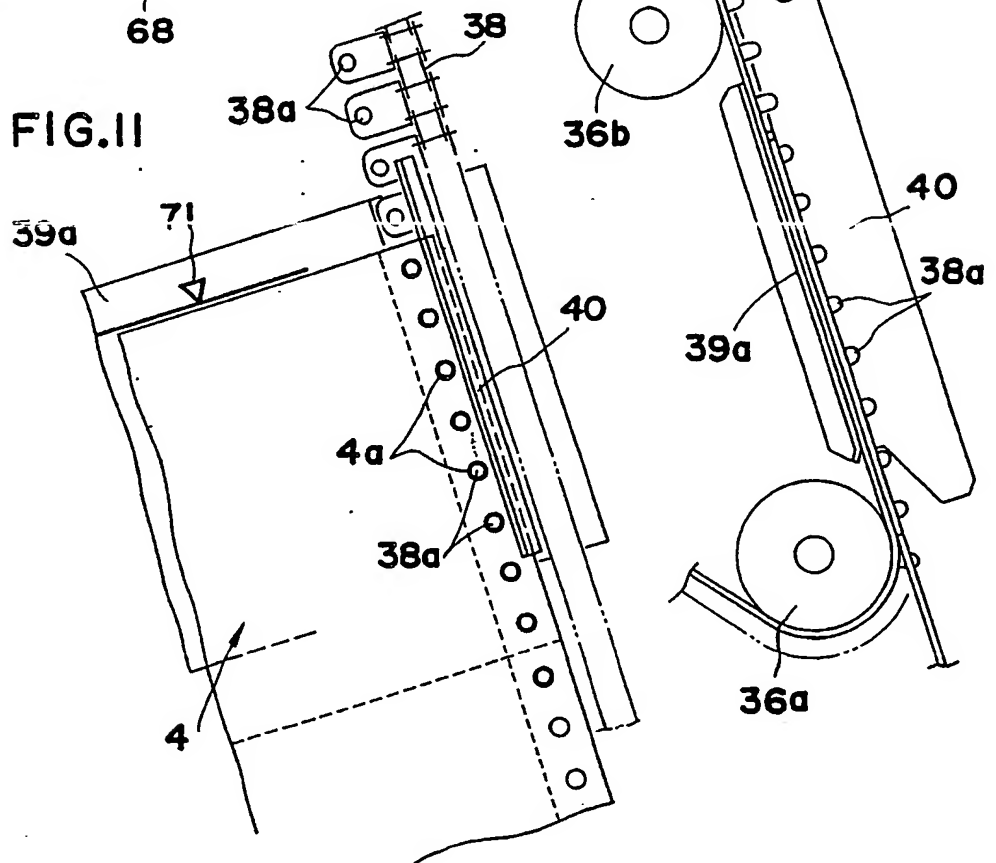


FIG.13

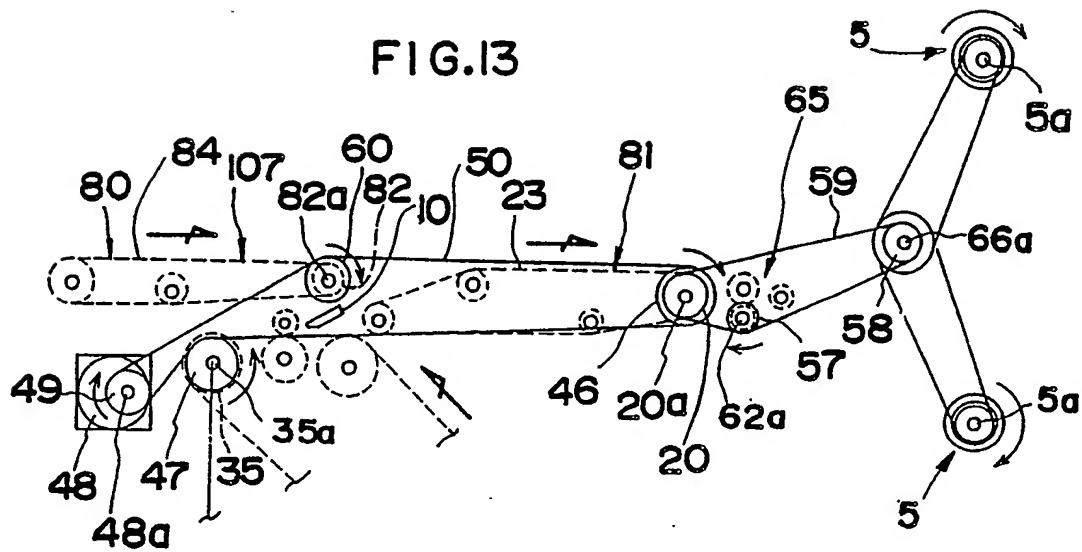


FIG. 14

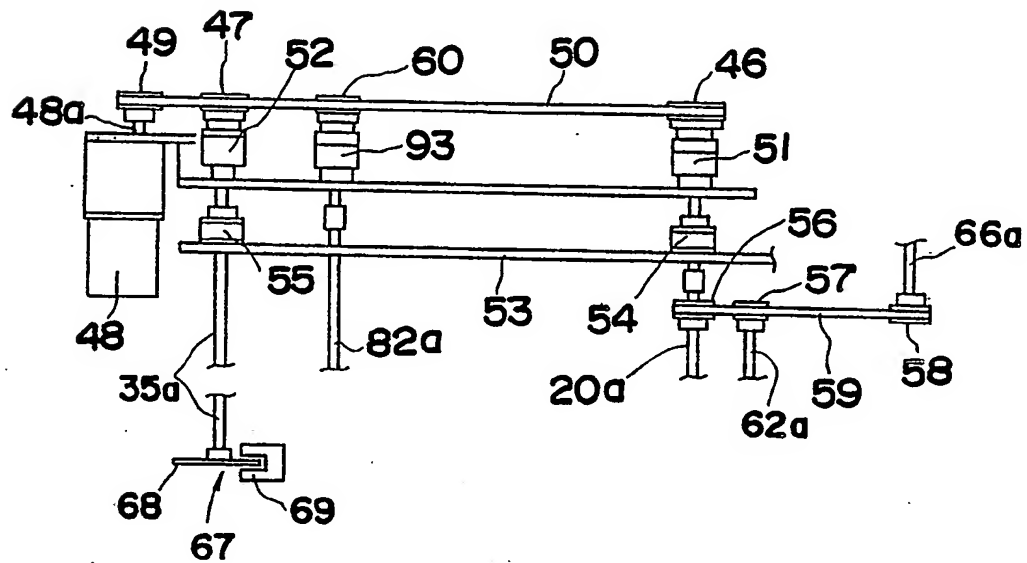
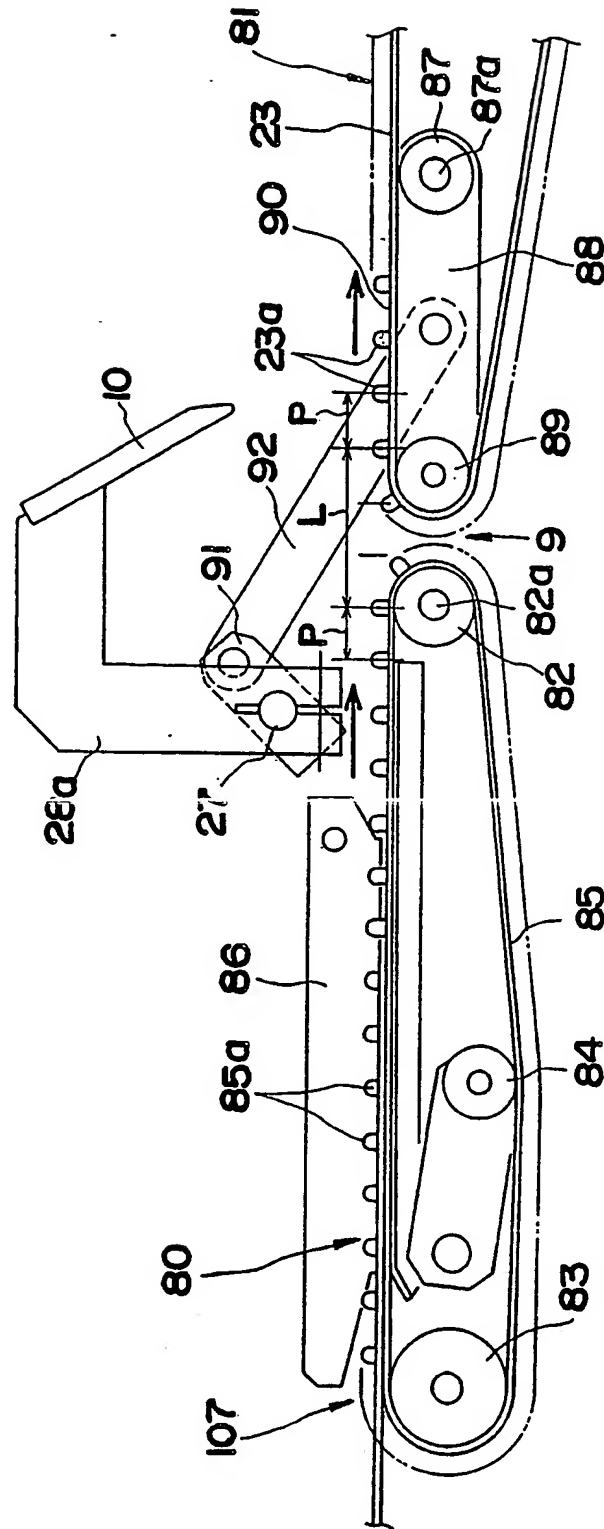


FIG. 15





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 89 10 1961

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	EP-A-0 226 840 (DAI NIPPON INSATSU) * Figures 1-2D; claim 1 * ---	1	B 65 C 1/02 B 65 C 9/18
A	AU-A- 540 581 (RAVEN PRODUCTS) * Figures 2,3; page 8, line 3 - page 9, line 5 * ---	1	
A	FR-A-2 114 534 (AVERY PRODUCTS) ---		
A	US-A-4 366 023 (VOLTMER) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26-04-1989	Examiner DEUTSCH J.P.M.
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